

SEED-APPLIED NEONICOTINOID INSECTICIDES EXACERBATE SLUG DAMAGE¹

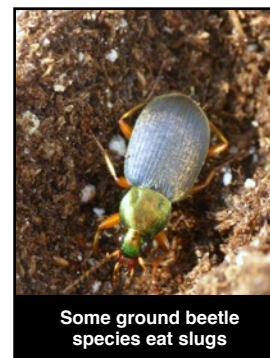
Slugs, a challenge for Mid-Atlantic no-till farmers

No-till farming benefits field and forage crop production by reducing soil erosion, conserving water, improving soil health, and reducing fuel and labor costs. One challenge of no-till in the Mid-Atlantic region, however, is slugs, which are mollusks (not insects) that thrive in the stable environment provided by no-till fields and can be particularly hard on corn, small grains, and soybeans, attacking seedlings and significantly reducing yields.



Neonicotinoid seed treatments disrupt biological control of slugs

Neonicotinoids are systemic insecticides that are often applied to soybean seeds to prevent damage from sporadic early-season insect pests. Our research, led by PhD candidate Maggie Douglas, reveals that these seed-applied insecticides can indirectly increase slug damage to crops by poisoning insects that eat slugs. In laboratory experiments, slugs were not affected by neonicotinoids, but ingested them; then, when predators attacked slugs, they were poisoned or killed. In the field, plots with neonicotinoid-treated seed had fewer predators, more slugs, and lower yield than plots without these insecticides.



Significance for no-till farmers: Farmers can improve slug control by growing crops without neonicotinoid seed treatments. Untreated seeds, and avoiding other unnecessary insecticide applications, will conserve predator populations and the control they provide. Sparing use of these seed treatments should also improve biocontrol of insect pests, and decrease concerns associated with pollution of surface water and negative impacts on wildlife, such as pollinators.

¹Douglas, MR, Rohr, JR, and Tooker JF. Neonicotinoid insecticide travels through a soil food chain, disrupting biological control of non-target pests and decreasing soybean yield. Published online in Early View of Journal of Applied Ecology, DOI: 10.1111/1365-2664.12372. Available upon request.